Ethanol Induced Developmental Defects can be Prevented with Supplementation of Vitamin E

{Original Article (Anatomy)}

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ABSTRACT

Background: Alcohol exposure during intrauterine life produces spectrum of disorders collectively termed as fetal alcohol syndrome. Apart from craniofacial and brain defects this syndrome produces various cardiac abnormalities such as atrial and ventricular septal defects, teratology of Fallot, transposition of the great arteries, truncus arteriosus. The mechanisms behind these ethanol induced deficits are unknown. This study was conducted to detect the preventive role of lipid soluble vitamin E in ethanol induced heart malformations in chick embryos cultured in ovo.

Study Design: Experimental study

Place and Duration of Study: This study was conducted at the in the school of Biomedical Sciences, University of Nottingham, UK for a period of 6 months.

Materials and Methods: White Leghorn chicken eggs were incubated for 3 days in 37°C with relative humidity of 100%.

Eggs were microinjected with 100µl of either PBS, vitamin E 200µM, SOD 2µM, 20% ethanol in PBS, or ethanol plus vitamin E and ethanol plus SOD dissolved in PBS.

On day 9 eggs were cracked and examined in terms of their viability. The viable embryos were examined for growth retardation by measuring crown rump length, and any malformations or gross abnormalities observed including limb deformities, facial defects, heart defects and brain vesicle development.

Results: Ethanol-induced alterations occurred in craniofacial development, vitelline circulation, crown rump length, facial abnormalities, brain development, which were prevented by addition of vitamin E and superoxide dismutase.

Conclusion: These results show that exposure of the chick embryos to ethanol during development result in structural changes in the heart that mimic malformations that occur in patients with fetal alcohol syndrome (FAS). These findings may be prevented with addition of vitamin E.
Key Words: Ethanol, Supplementation, Vitamin E.

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